AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

LISTING OF CLAIMS:

Claims 1-34 (Cancelled).

Claim 35 (Currently amended). A process for producing astaxanthin comprising:

(a) cultivating in a suitable culture medium a recombinantly produced host cell containing a polynucleotide selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, a polynucleotide that encodes the polypeptide of SEQ ID NO: 1, and a polynucleotide that hybridizes to the complement of SEQ ID NO: 2 or SEQ ID NO: 3 under the following stringent hybridization conditions: 50% v/v formamide, 5X SSC, 2% w/v blocking agent, 0.1% N-lauroylsarcosine, 0.3% SDS at 65°C ~~42°C~~ overnight and wherein the hybridizing polynucleotide encodes a polypeptide having astaxanthin synthetase activity; and

(b) recovering astaxanthin from the host cell or the culture medium.

Claim 36 (Previously presented). A process according to claim 35 wherein the polynucleotide encodes a polypeptide, which is SEQ ID NO: 1.

Claim 37 (Previously presented). A process according to claim 35 wherein the polynucleotide is SEQ ID NO: 2.

Claim 38 (Previously presented). A process according to claim 35 wherein the polynucleotide is SEQ ID NO: 3.

Claim 39 (Cancelled).

Claim 40 (Previously presented). A process according to claim 35 wherein the polynucleotide encodes a polypeptide having astaxanthin synthetase activity and hybridizes to the complement of SEQ ID NO: 2 under the stringent hybridization conditions.

Claim 41 (Previously presented). A process according to claim 35 wherein the polynucleotide encodes a polypeptide having astaxanthin synthetase activity and hybridizes to the complement of SEQ ID NO: 3 under the stringent hybridization conditions.

Claim 42 (Previously presented). A process according to claim 35 wherein the polynucleotide is selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, and a polynucleotide that encodes the polypeptide of SEQ ID NO: 1.

Claim 43 (Previously presented). A process according to claim 35 wherein the polynucleotide is carried on a vector.

Claim 44 (Currently amended). A process for producing astaxanthin comprising:

(a) introducing into a host organism a polynucleotide selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, a polynucleotide that encodes the polypeptide of SEQ ID NO: 1, and a polynucleotide that hybridizes to the complement of SEQ ID NO: 2 or SEQ ID NO: 3 under the following stringent hybridization conditions: 50% v/v formamide, 5X SSC, 2% w/v blocking agent, 0.1% N-lauroylsarcosine, 0.3% SDS at 65°C ~~42°C~~ overnight and wherein the stringent conditions include hybridizing and washing in 5XSSC at about 65°C ~~42 °C~~ and wherein the hybridizing polynucleotide encodes a polypeptide having astaxanthin synthetase activity;

(b) cultivating the organism in a suitable culture medium; and

(c) recovering astaxanthin from the host organism or the culture medium.

Claim 45 (Previously presented). A process according to claim 44 wherein the polynucleotide is selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, and a polynucleotide that encodes the polypeptide of SEQ ID NO: 1.

Claim 46 (Currently amended). A process for producing astaxanthin comprising contacting beta-carotene with a polypeptide encoded by a polynucleotide selected from the group consisting of

SEQ ID NO: 2,

SEQ ID NO: 3,

a polynucleotide that encodes the polypeptide of SEQ ID NO: 1,

and a polynucleotide that hybridizes to the complement of SEQ ID NO: 2 or SEQ ID NO: 3

under the following hybridization conditions: 50% v/v formamide, 5X SSC, 2% w/v blocking agent, 0.1% N-lauroylsarcosine, 0.3% SDS at 65°C ~~42°C~~ overnight and wherein the hybridizing polynucleotide encodes a polypeptide having astaxanthin synthetase activity in the presence of an electron donor, which is capable of reducing a reaction center of the polypeptide ~~polypepetide~~ in a reaction mixture containing a reconstituted membrane.

Claim 47 (Previously presented). A process according to claim 46, wherein the polypeptide is present in the form of a reconstituted membrane prepared from a biological membrane.

Claim 48 (Previously presented). A process according to claim 47 wherein the membrane is a microsome or a mitochondrial membrane.

Claim 49 (Previously presented). A process according to claim 46 wherein the polypeptide is present in the form of a reconstituted artificial membrane.

Claim 50 (Previously presented). A process according to claim 49 wherein the reconstituted artificial membrane is a liposome.

Claim 51 (Cancelled).

Claim 52. (Previously presented). A process according to claim 46 wherein the electron donor is cytochrome P450 reductase.